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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/920,390	07/31/2001	Meng-Jaw Cherng	JCLA4757-CIP	4405

7590  
J.C. PATENTS  
Suite 250  
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Irvine, CA 92618

12/04/2002

EXAMINER
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MALDONADO, JULIO J

ART UNIT	PAPER NUMBER
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2823

DATE MAILED: 12/04/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/920,390

Applicant(s)

CHERNG ET AL.

Examiner

Julio J. Maldonado

Art Unit

2823

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 23 September 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

Art Unit: 2823

**GROUND OF THE REJECTION**

**DETAILED ACTION**

***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoon et al. (6,117,766) in view of Jeong (U.S. 5,960,310).

In reference to claims 1, 6, 12 and 15, Yoon et al. (Figs. 2A-2F) in a related method to form contact plugs (110) teach providing a semiconductor device having a first and second gates (102) over a substrate (100), wherein the said first and second gates (102) have sidewall spacers (102c); forming a silicon oxide layer (104) over the semiconductor device; patterning the dielectric layer (104) without planarizing the dielectric layer, to form a self-aligned contact window (106) that exposes a surface of the substrate (100) between the said first and second gates (102); forming a polysilicon layer (108) over the dielectric layer (104) and filling the self-aligned contact window (106); removing a portion of the polysilicon layer (108) lying above the dielectric layer (104); and removing a portion of the dielectric layer (104) so that the contact plug (110) is formed inside the self-aligned contact window (106) (column 3, line 48 – column 5, line 27).

Art Unit: 2823

Yoon et al. fail to teach forming a silicon nitride liner layer prior to deposit a dielectric layer and patterning the dielectric and liner layer without planarizing the dielectric layer to form a contact window. However, Jeong (Figs.4A-4G) in a related method to form contact plugs teaches forming a dielectric liner layer (77) prior to deposit a dielectric layer (79, 81) and patterning the dielectric (79, 81) and liner layer (77) without planarizing the dielectric layer (79, 81) to form a contact window (82). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to form a dielectric liner layer followed by depositing a dielectric layer as taught by Jeong in the contact plug method of Yoon et al., since the liner layer can be used as a polishing stop, accurately ending the polishing step (column 1, lines 53-57).

In reference to claims 2-5, 7-11, 13, 14 and 16-19, Yoon et al. in combination with Jeong teach the dielectric liner layer comprising silicon nitride (see Jeong, column 6, lines 35-40); the dielectric layer comprising silicon oxide, where the dielectric layer comprises a dielectric layer with a good gap-filling capability and a dielectric passivation layer (see Yoon et al., column 3, line 66 – column 4, line 9 and Jeong, column 6, lines 41-65); and removing the portion of the polysilicon above the dielectric layer includes chemical-mechanical polishing (see Yoon et al., column 4, lines 24-64 and Jeong, column 7, lines 21-51). Yoon et al. in combination with Jeong fail to teach the dielectric layer having a thickness of about 10,000Å to 15,000Å. However, The selection of the claimed range is obvious because it is a matter of determining optimum process condition by routine experimentation with a limited number of species. In re Jones, 162

Art Unit: 2823

USPQ 224 (CCPA 1955)(the selection of optimum ranges within prior art general conditions is obvious) and In re Boesch, 205 USPQ 215 (CCPA 1980)(discovery of optimum value of result effective variable in a known process is obvious).

### ***Response to Arguments***

3. Applicants' arguments filed 9/23/2002 have been fully considered but they are not persuasive.

Applicants' argue that the contact windows on Yoon et al. because "each of them is narrower than the substrate between two gate structures" (page 5, lines 1 –7). Furthermore, applicants' argue, "...a real self-aligned contact window ***should be wider than the substrate between two gate structures...***" (page 5, lines 1 –7). In response to this argument, Fu et al. to 6,245,669 in Fig.8 and related text teach a method to form a self-aligned contact window (43), wherein said contact window expose a portion of the surface of the substrate (10) between two gate structures (14). Furthermore, claims 1, 6, 12 and 18 teach the formation of a "self-aligned contact window that exposes a surface of the substrate between the said first and second gates" (e.g., see claim 1, page 11, lines 7 – 9). Claims 1, 6, 12 and 18 teach exposing a surface of the substrate between the first and second electrode, not **the** surface between the first and second electrode. In conclusion, the examiner respectfully submits that Yoon et al. teach a "self-aligned contact window that exposes a surface of the substrate between the said first and second gates" as claimed.

Art Unit: 2823

***Conclusion***

4. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

5. Papers related to this application may be submitted directly to Art Unit 2823 by facsimile transmission. Papers should be faxed to Art Unit 2823 via the Art Unit 2823 Fax Center located in Crystal Plaza 4, room 3C23. The faxing of such papers must conform to the notice published in the Official Gazette, 1096 OG 30 (15 November 1989). The Art Unit 2823 Fax Center number is **(703) 305-3432**. The Art Unit 2823 Fax Center is to be used only for papers related to Art Unit 2823 applications.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Julio J. Maldonado** at **(703) 306-0098** and between the hours of 8:00 AM to 4:00 PM (Eastern Standard Time) Monday through Friday or by e-mail via [julio.maldonado@uspto.gov](mailto:julio.maldonado@uspto.gov). If attempts to reach the examiner by telephone

Art Unit: 2823

are unsuccessful, the examiner's supervisor, Olik Chaudhuri, can be reached on (703) 306-2794.

Any inquiry of a general nature or relating to the status of this application should be directed to the **Group 2800 Receptionist** at (703) 308-0956.

***Julio J. Maldonado***

Patent Examiner

Art Unit 2823

703-306-0098

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Olik Chaudhuri

**Supervisory Patent Examiner  
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